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AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 152

POTEZ 37R2 MILITARY AIRPLANE

A Two-Place Long-Distance Observation Monoplane

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A Two-Place Long-Distance Observation Monoplane

This monoplane is all metal, including the covering, and has two wings joined to a central section. Each wing is supported by oblique struts from the lower edge of the fuselage. The central section is connected with the fuselage by a cabane of streamlined tubular struts. (Figs. 1, 2 & 3.) The inside of the wings can be inspected to their smallest details without taking them apart. Each wing (fig. 5) consists of five separate parts: central box, leading edge, tip, aileron and "false aileron." These parts are assembled by outside fittings of special high-resistance steel.

The central part has two spars to which the ribs are attached. The ribs, placed at intervals of about 1 m (3.28 ft.) support longitudinal members to which the covering is riveted. (Fig. 4.) The spars have an I section, the flanges consisting of corrugated strips of special high-resistance steel. The spar webs are made of L2R alloy and taper toward the wing tips.

The ribs also have an I section with flanges of L2R. The rib webs are plain and are made from sheet L2R. The longitudinal members, which support the wing covering, are also of L2R with U section. The covering consists of corrugated L2R. The oblique braces (fig. 4) are L2R profiles riveted, so as to avoid distortion and abnormal stresses in the covering. In order to facilitate inspection of the wing, its lower surface has large removable panels attached by special fittings. The leading edge is removable and is attached by steel fittings opposite each rib.

Each wing tip has five spars, an edge strip and false ribs of L2R. Two of the five spars correspond to the wing spars and carry attachment fittings. The rib adjacent to the wing is trellised, thus affording access to the inside of the wing tip. The covering is the same as on the rest of the wing.

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*From Bulletin Technique des Avions H. Potez, January, 1931.

The control mechanism for each aileron is attached to the rear side of the rear wing spar. From this mechanism there runs, on the one hand, the rod attached directly to the aileron horn and, on the other hand, the control rod which passes inside the fairing of the rear strut to the pilot's cockpit. The aileron has a triangular cross section, with a spar and a covering like the rest of the wing. Each aileron has four hinges with ball bearings. The false ailerons are rigidly attached to the wings by standard fittings of high-resistance steel.

The cabane consists of two sets of N struts (figs 2 & 3) corresponding to the lateral faces of the fuselage. These are braced by two faired wires. (Fig. 1.)

The wing structure (fig. 4) shows the distribution of the members which support the sheet-metal covering. The corrugations of the covering are parallel to the direction of flight and at right angles to the supporting strips. The latter are in turn supported by the ribs, which are attached to the two spars.

The separation of the wing into five parts, as shown in Figure 5, has many advantages, both from the viewpoint of manufacture and from that of upkeep (repair or replacement of a damaged part).

Inspection and repairs of the wing covering are facilitated by removable panels on its lower surface. The upper covering is attached by direct riveting. Figure 6 shows lower side of central part of wing with panels removed.

The central section (fig. 7) has a structure similar to that of the detachable portions. It contains a water tank which forms the leading edge.

The oblique struts are alike, the front portion consisting of sheet steel, which is faired by a rear portion of L2R alloy. Their outer and upper ends are provided with fittings which enable the adjustment of the angle of setting of the wings.

The fuselage consists of three parts: front, central, and rear. The front part is attached to the central part by four easily accessible bolts. The central part is the fuselage proper and includes the cockpits of the pilot and observer, the fuel and oil tanks, the armament and equipment.

It has a trellised framework of L2R metal in the form of U sections. (Fig. 9.) The L2R covering is the same as on the wings. Riveted to the fuselage framework, it makes a rigid assembly.

The rear part (fig. 11) is essentially the frustum of a cone of sheet L2R strengthened inside by L2R longerons of U section and by L2R bulkheads. It is bolted to the four longerons of the central part of the fuselage. (Fig. 10.)

The control mechanism (fig. 12) consists of an absolutely rigid assembly supporting all the flight controls, as well as the pilot's seat, which is adjustable during flight. The observer's control stick is quickly removable. The controls consist of L2R and steel tubes. All the controls are mounted on ball bearings. The ailerons are controlled by horns attached to the aileron spars, as already explained.

The rudder and elevator are operated by rods running along the left wall inside the fuselage. In the observer's cockpit these rods are protected by removable casings. The stabilizer can be adjusted during flight by a wheel situated at the left of the pilot. This wheel actuates, by means of cables, a screw attached to the sternpost, to which is attached, in turn, the rear part of the stabilizer.

The tail is all metal. The fin consists of a triangular box attached at a point behind the sternpost. This box has a removable leading edge, like that of the wing. The rudder is hinged to the sternpost by three ball-bearing hinges.

The horizontal tail surfaces are constructed like the wing and fin. The covering is sheet L2R. The stabilizer is braced on each side of the fuselage by inverted V struts attached to the last two fuselage frames. It is hinged to the middle of the fuselage in such a way as to prevent all lateral play.

The elevator consists of two parts with ball-bearing hinges. The two parts are coordinated by means of control rods ending at the central levers of the fuselage.

The landing gear is of the axleless type. It consists of two independent parts, each composed of two rigid and one elastic strut. The front rigid strut

absorbs the bending stresses transmitted by the wheel. The rear rigid strut absorbs the recoil stresses of the landing gear. Both together absorb the torsional stresses produced by braking. They are hinged to the fuselage by an elastic joint (Silentbloc).

The Potez elastic strut operates by the compression of rubber disks or washers. This strut is supported at the bottom by the rigid struts and at the top by the lower end of the front wing strut and two compression bars. These elastic struts insure a gentle landing, due to their elasticity under light loads and to the progressive damping of the shocks. In order to allow play for the elastic struts, each strut is provided at both ends with joints permitting displacement. All the joints are provided with "Tecalemit" grease cups. The wheels are equipped with brakes with differential controls. The wheels measure 800 × 175 mm (31.5 × 6.9 in.).

The tail skid consists of two hinged bars at the lower end of the sternpost. The lower bar is provided with a shoe secured by bolts. The upper bar is a Potez elastic strut. The whole skid is partially inclosed in the rear end of the fuselage.

Characteristics

Span	14.200 m	46.59 ft.
Length	10.285 m	33.74 ft.
Total height	3.500 m	11.48 ft.
Height of propeller axis above ground:		
a) Airplane at rest	2.45 m	8.04 ft.
b) Airplane in line of flight	2.00 m	6.56 ft.
Track	3.00 m	9.34 ft.
Total area of wing	35.20 m^2	378.89 sq.ft.
Area of ailerons	3.60 m^2	38.75 "
Area of vertical tail surfaces	1.85 m^2	19.91 "
Area of horizontal tail surfaces	4.95 m^2	53.28 "
Weight empty	1631.8 kg	3597.50 lb.
Fuel and oil	340.0 kg	749.57 "
Useful load	549.6 kg	1211.66 "
Total weight	2521.4 kg	5558.73 "
Speed with 2500 kg total weight	264 km/h	164.04 mi./hr.
Climb to 5000 m (16400 ft.)	17 min.10 sec.	

Ceiling	7500 m	24606 ft.
Take-off run	190 m	623.4 ft.
Landing run	205 m	672.6 ft.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

Fig. 1

Span:
14.200 m 46.59 ft.

Length:
10.285 m 33.74 ft.

Height:
3.500 m 11.48 ft.

Wing area:
35.20 m^2 378.89 sq.ft.

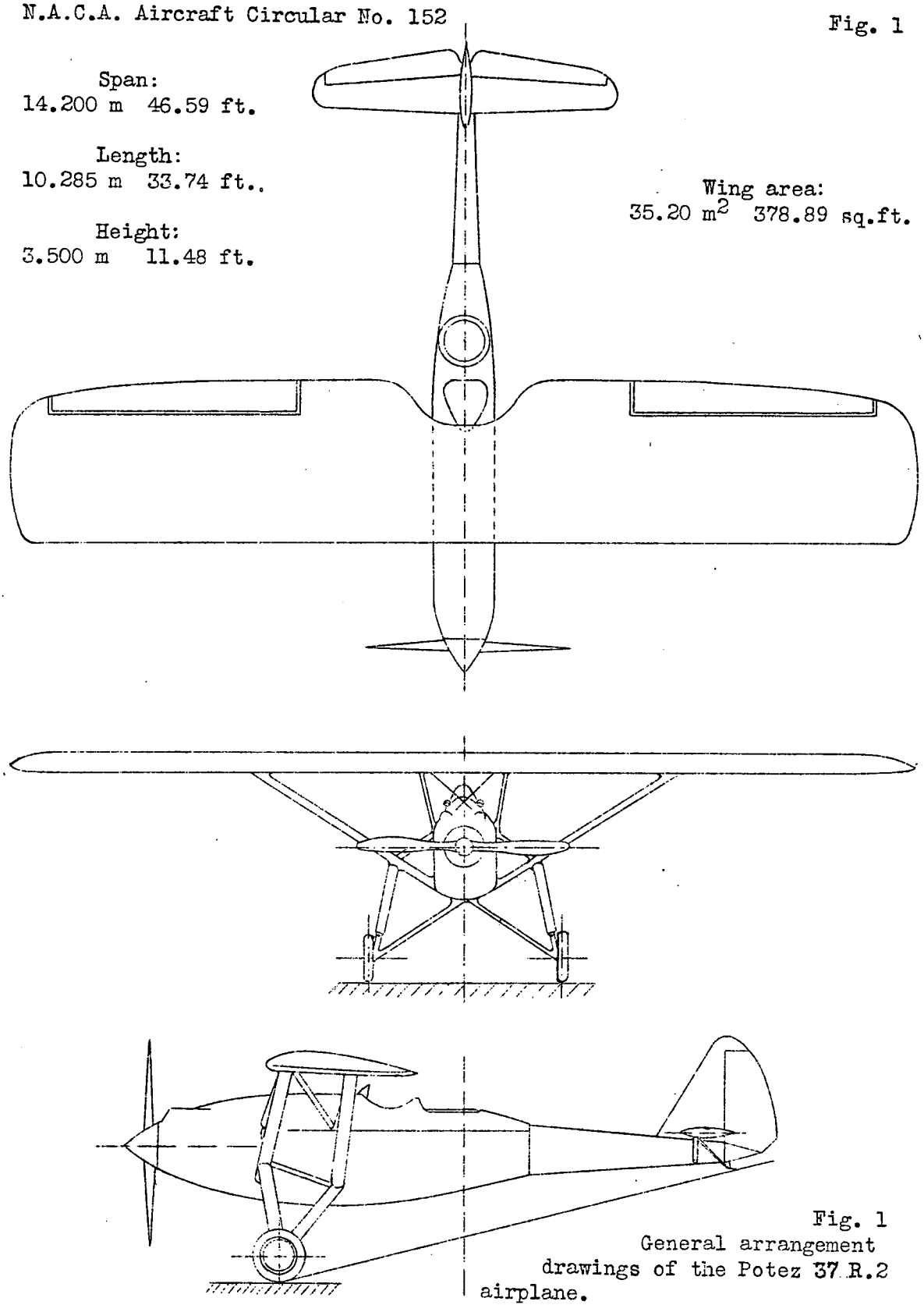


Fig. 1
General arrangement drawings of the Potez 37 R.2 airplane.

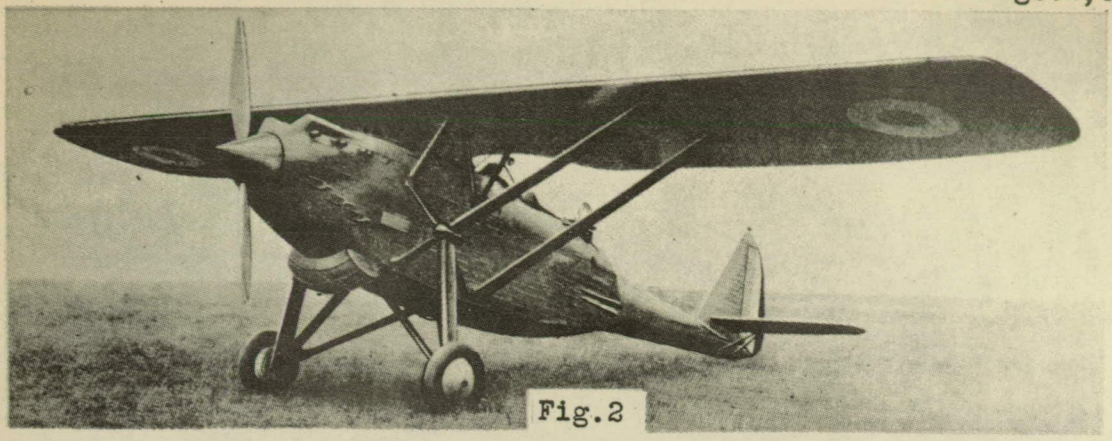


Fig.2

Fig.3

Figs.2,3 Three-quarter views of the Potez R.2 airplane.

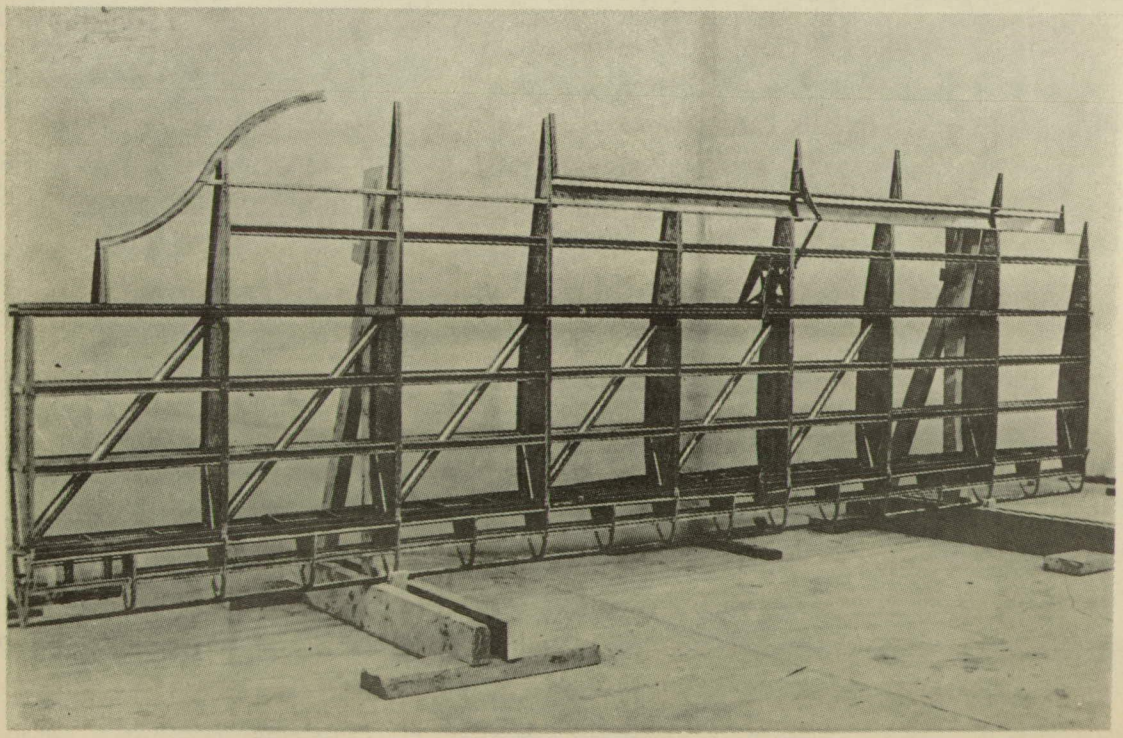


Fig.4 Wing structure of the 37 R.2

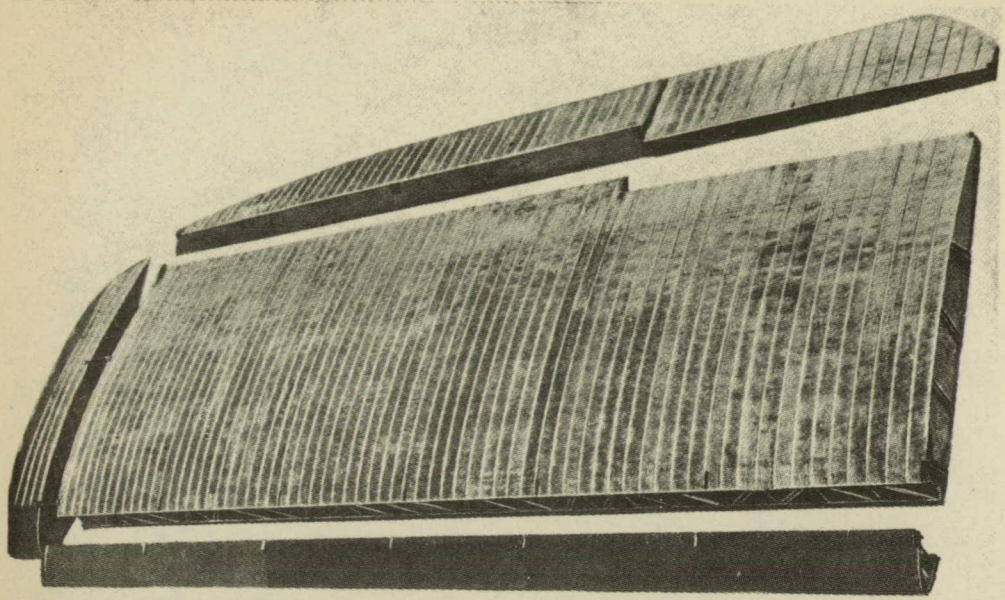


Fig.5 The five separate parts of the wing of the 37 R.2

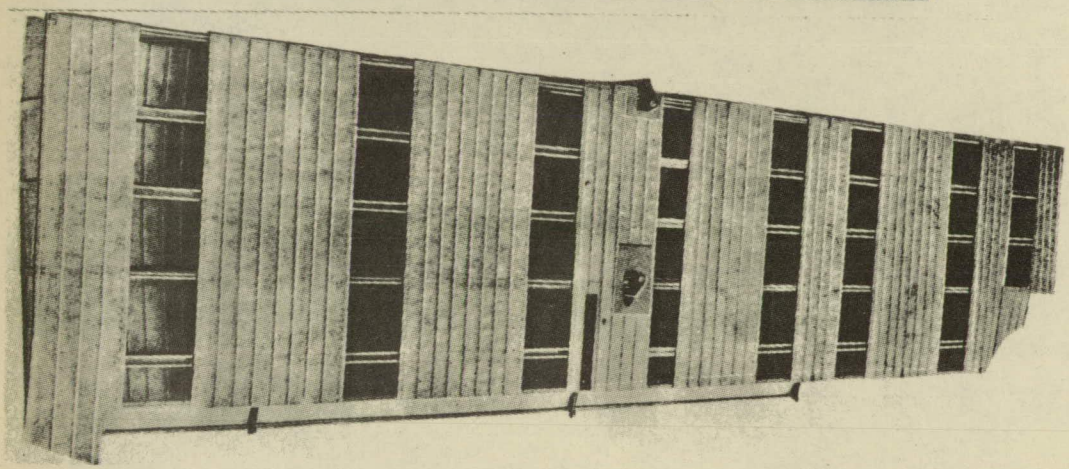


Fig.6 Under side of the wing with panels removed.

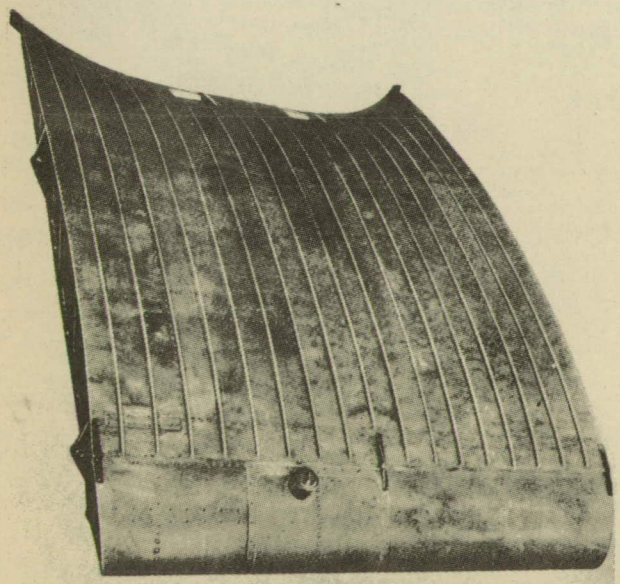


Fig.7 Central wing portion complete with reserve water tank.

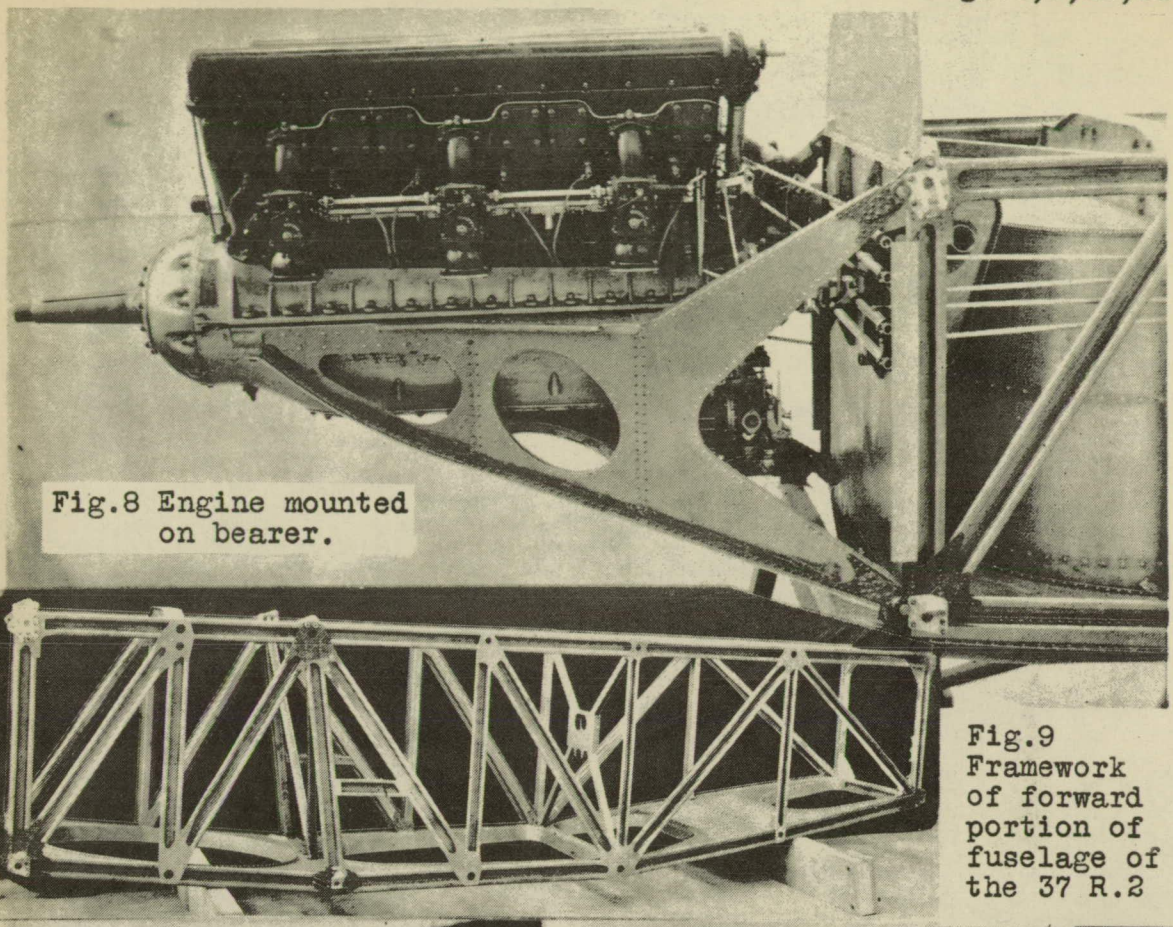


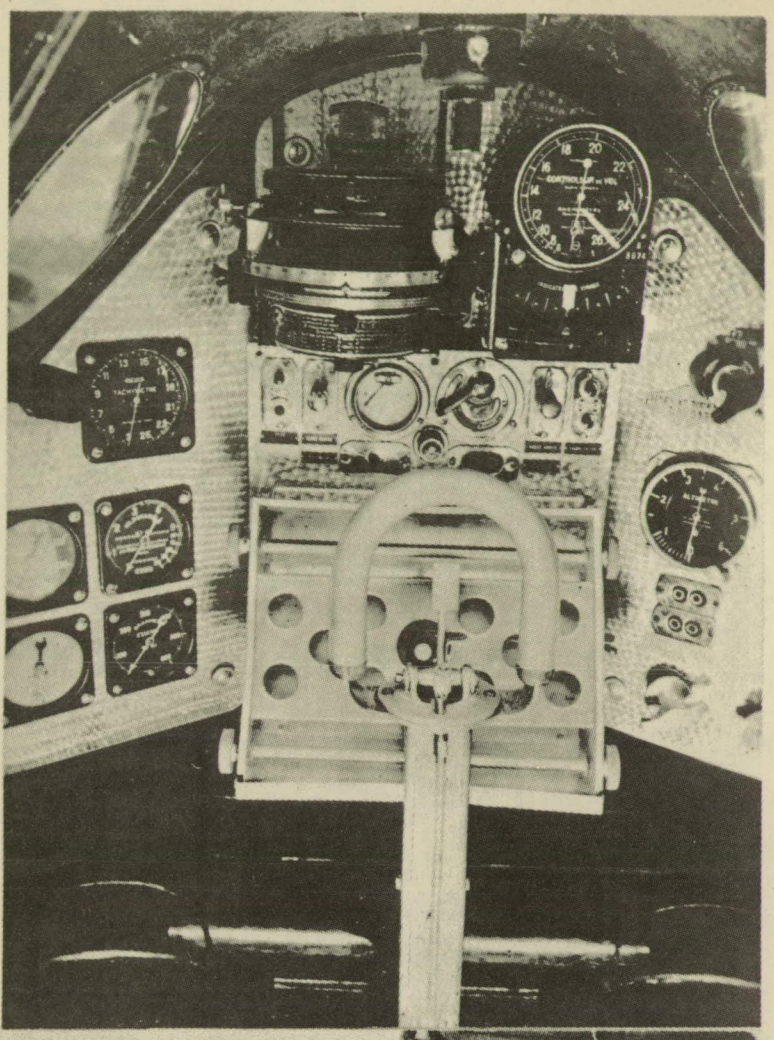
Fig.8 Engine mounted on bearer.

Fig.9 Framework of forward portion of fuselage of the 37 R.2

Fig.10 Front and rear portion assembled.

Fig.11 Rear portion of fuselage.

Fig.13 Pilot's cockpit of the Potez 37 R.2 airplane.



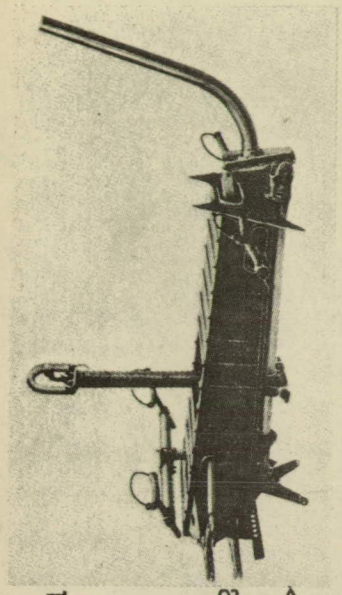


Fig.12 Rigid assembly of the controls of the 37 R.2

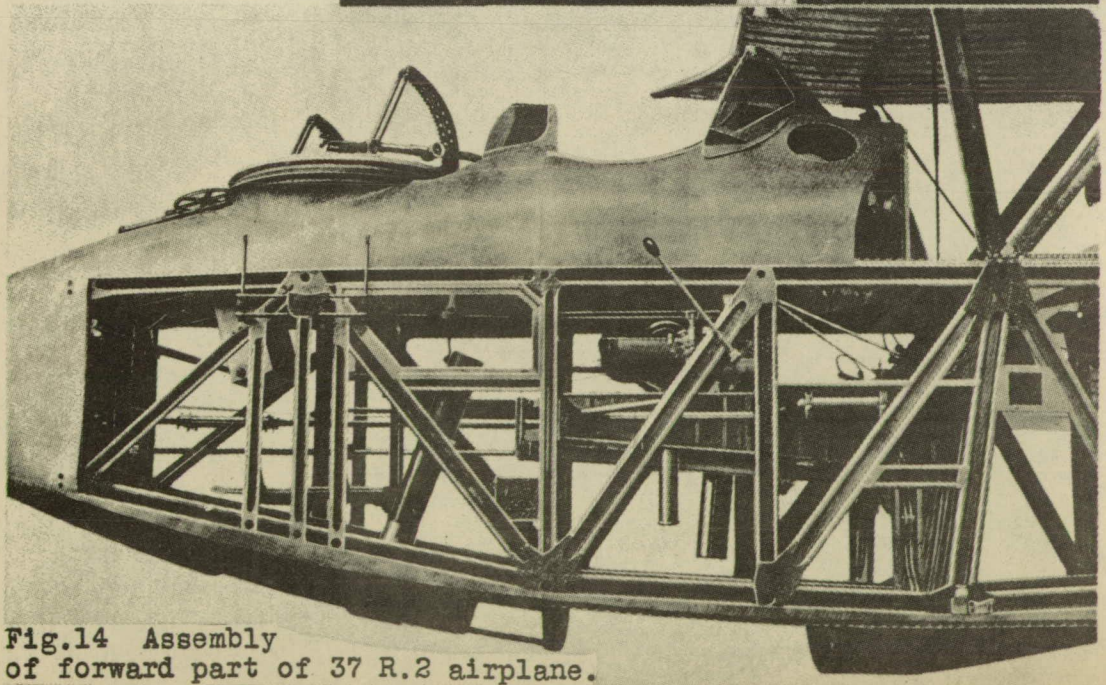


Fig.14 Assembly of forward part of 37 R.2 airplane.